

CLAIMS:

1. A device used for accessing fluid in the interior of a vial through a pierceable seal located on the vial, and to facilitate the transfer of said fluid into a syringe, comprising:

5 a piercing element having an exterior surface, an interior bore, a distal end and a proximal end, said distal end comprising a point and having at least one hole at or near said point in fluid communication with said bore, said proximal end comprising a connecting piece adapted to connect the device to a syringe; and

10 a locking structure projecting outward from the exterior surface of said piercing element, whereby said locking structure permits penetration of the pierceable seal by said piercing element, but prohibits withdrawal of the piercing element back through the pierceable seal.

2. The device of Claim 1, further comprising a stop which limits
15 penetration of said piercing element into the interior of said vial.

3. The device of Claim 2, wherein said stop comprises a round disk located proximal said hole in said piercing element.

4. The device of Claim 2, wherein said stop comprises a tab
20 extending laterally from said piercing element and located proximal said hole in said piercing element.

5. The device of Claim 1, wherein said locking structure comprises at least one barb.

6. The device of Claim 5, wherein the barb extends at a 45° angle away from the exterior surface of said piercing element.

25 7. The device of Claim 1, wherein the connecting piece is adapted to form a substantially fluid-tight seal with said syringe.

8. A method of accessing and transferring fluid inside a vial through a pierceable seal on the vial, comprising:

30 connecting a syringe to a piercing element, said piercing element having an exterior surface, an interior bore, a distal point and at least one hole at or near said point in fluid communication with said bore, and a

locking structure projecting outward from the exterior surface of said piercing element, whereby said locking structure permits penetration of the pierceable seal by said piercing element, but prohibits withdrawal of the piercing element back through the pierceable seal;

5 piercing said pierceable seal with said piercing element;

 inserting said piercing element into the vial until said hole in said piercing element contacts the fluid inside the vial;

 withdrawing a desired amount of fluid through the internal bore in said piercing element and into the syringe; and

10 separating the syringe from the piercing element, such that the locking structure on the piercing element prohibits the withdrawal of the piercing element through said pierceable seal.

9. The method of Claim 8, wherein said inserting step is performed prior to said connecting step.

15 10. The method of Claim 8, further comprising connecting a second syringe to said piercing element, and repeating said withdrawing and separating steps.

11. The method of Claim 8, wherein said syringe forms a substantially fluid-tight seal with said piercing element.

20 12. A locking cannula for advancing through a pierceable seal and resisting retraction therefrom, comprising:

 a housing;

 a piercing element on said housing; and

25 a locking structure connected to said housing for advancing through a seal and resisting retraction therefrom.

13. The cannula of Claim 12, wherein said locking structure extends from said piercing element.

14. The cannula of Claim 13, wherein said locking structure comprises one or more barbs.

15. The cannula of Claim 14, wherein said barbs are angled with respect to said piercing element to facilitate advancement of said cannula through said seal.

5 16. The cannula of Claim 12, wherein said housing further comprises a stop.

17. The cannula of Claim 16, wherein said locking structure extends from said stop.

18. The cannula of Claim 16, wherein said stop is a primarily disc shaped structure extending from said housing.

10 19. The cannula of Claim 12, wherein said housing includes a syringe-connecting structure located opposite said piercing element.

15 20. The cannula of Claim 12, wherein said housing has a bore therein and said piercing element includes a hole passing from an outside surface thereof and connected to said bore, whereby a fluid conduit is formed from the outside of said piercing element through said housing.

21. A connector for accessing fluid in a vial, comprising:

a piercing element having a proximal end and a distal end, said element having a bore therethrough and said distal-end comprising a point for penetrating a seal on said vial; and

20 a valve, said valve having a proximal end and a distal end, said distal end designed for connection to said proximal end of said piercing element, said valve further including a spike and a seal.

25 22. The connector of Claim 21, wherein said proximal end of said piercing element comprises a housing having a bore therein, and said distal end of said valve comprises a connecting portion having a bore therein and sized for insertion into said proximal end of said piercing element.

23. The device of Claim 21, further comprising a stop which limits penetration of said piercing element into the interior of said vial.

30 24. The device of Claim 23, wherein said stop comprises a round disk located proximal said hole in said piercing element.

25. The device of Claim 23, wherein said stop comprises a tab extending laterally from said piercing element and located proximal said hole in said piercing element.

26. The device of Claim 21, wherein said locking structure comprises at least one barb.

27. The device of Claim 26, wherein the barb extends at a 45° angle away from the distal point of said piercing element.

28. The device of Claim 21, wherein the connecting piece is adapted to form a substantially fluid-tight seal with said syringe.

29. The device of Claim 21, wherein said proximal end of said valve is adapted for connection to a syringe.

30. The device of Claim 21, wherein said valve includes a housing having a bore therein in which said spike and seal are located.

31. The device of Claim 30, wherein the distal end of said housing is threaded on an interior surface thereof and said proximal end of said piercing element is threaded for engagement with said threads in said housing.

32. A multiple use connector for accessing fluid in a vial with a syringe, comprising:

a member having a proximal end and a distal end, said distal end comprising a piercing element for penetrating a seal on said vial, and wherein said member includes a seal and a spike located within a housing portion of said member, said housing portion located between said proximal and distal ends.

33. A medical valve adaptor for use with containers of fluid, said valve adaptor comprising:

a first body having proximal and distal ends, and a cavity therein;

a first spike located within said cavity and attached to said proximal end;

a seal located on said first spike;

one or more tabs connected to said first body and extending from said first body into said cavity and against said first spike to lock said first spike and seal within the cavity in said first body;

a tubular second body having proximal and distal ends;

5 a tubular second spike located on the distal end of said second body and in fluid communication therewith; and

a locking mechanism located on the proximal end of said second body, said locking mechanism adapted to secure the proximal end of said first body to, and in fluid communication with, the proximal end of said second body.

10 34. A medical three-way valved connector for use with containers of fluid, said valved connector comprising:

a first body having proximal and distal ends, and a cavity therein;

15 a spike located within said cavity and attached to said proximal end of said first body;

a seal located on said spike;

one or more tabs connected to said first body and extending from said first body into said cavity and against said spike to lock said spike and seal within the cavity in said first body;

20 a tubular second body having proximal and distal ends;

a tubular branch located at an angle to, and toward the proximal end of, said second body, and in fluid communication therewith; and

25 a locking mechanism located on the proximal end of said second body, said locking mechanism adapted to secure the proximal end of said first body to, and in fluid communication with, the proximal end of said second body.

35. A medical valve adaptor for use with medical three-way fluid connectors, said valve adaptor comprising:

a first body having proximal and distal ends, and a cavity therein;

30 a first spike located within said cavity and attached to the proximal end of said first body;

a seal located on said first spike;

one or more tabs connected to said first body and extending from said first body into said cavity and against said first spike to lock said first spike and seal within the cavity in said first body;

5 a tubular second body having proximal and distal ends;

a cylindrical housing adapted to surround the end of said three-way connector and located on the distal end of said second body;

a tubular second spike located on the distal end of said second body and within said housing, and in fluid communication with said second body;

10 a hook located on said housing and adapted to engage said three-way connector such that said valved adaptor is secured to said three-way connector; and

15 a locking mechanism located on the proximal end of said second body, said locking mechanism adapted to secure the proximal end of said first body to, and in fluid communication with, the proximal end of said second body.

36. A medical valve adaptor for use with medical three-way fluid connectors, said valve adaptor comprising:

20 a first body having proximal and distal ends, and a cavity therein;

a first spike located within said cavity and attached to the proximal end of said first body;

a seal located on said first spike;

25 one or more tabs connected to said first body and extending from said first body into said cavity and against said first spike to lock said first spike and seal within the cavity in said first body;

a tubular second body having proximal and distal ends;

a cylindrical housing adapted to surround the end of said three-way connector and located on the distal end of said second body;

a tubular second spike located on the distal end of said second body and within said housing, and in fluid communication with said second body;

an opening having one or more tabs, said opening located on said housing and adapted to engage said three-way connector such that said valved adaptor is secured to said three-way connector and partially held in place by said tabs; and

a locking mechanism located on the proximal end of said second body, said locking mechanism adapted to secure the proximal end of said first body to, and in fluid communication with, the proximal end of said second body.

37. A medical valve adaptor for use with narrowly necked fluid containers, said valve adaptor comprising:

a first body having proximal and distal ends, and a cavity therein;

a first spike located within said cavity and attached to the proximal end of said first body;

a seal located on said first spike;

one or more tabs connected to said first body and extending from said first body into said cavity and against said first spike to lock said first spike and seal within the cavity in said first body;

a tubular second body having proximal and distal ends;

an open-ended tube adapted to reach into and withdraw fluids from said narrowly necked container, said tube located on the distal end of and in fluid communication with said second body; and

a locking mechanism located on the proximal end of said second body, said locking mechanism adapted to secure the proximal end of said first body to, and in fluid communication with, the proximal end of said second body.